

Claims

- [c1] 1. An ESD protection circuit comprising:
 - one or more inverters, each of said one or more inverters having an input and an output;
 - a timing element for triggering said one or more inverters, said timing element having an output node, said output node connected with said input of at least one of said one or more inverters;
 - a clamping device joined with said output of at least one of said one or more inverters; and
 - a feedback device for preventing said clamping device from turning off until completion of a high current portion of an ESD event, said feedback device in communication with said clamping device and said output node of said timing element.
- [c2] 2. An ESD protection circuit according to claim 1, wherein said feedback device prevents said clamping device from turning off for at least the first 500 ns of the ESD event.
- [c3] 3. An ESD protection circuit according to claim 1, wherein said timing element is an RC network.

- [c4] 4. An ESD protection circuit according to claim 3, wherein said RC network includes one or more resistors, and one or more decoupling capacitors.
- [c5] 5. An ESD protection circuit according to claim 1, wherein said feedback device is an NFET.
- [c6] 6. An ESD protection circuit according to claim 1, wherein each of said one or more inverters includes a PFET and an NFET.
- [c7] 7. An ESD protection circuit according to claim 1, wherein said one or more inverters comprises at least three inverters.
- [c8] 8. An ESD protection circuit comprising:
 - one or more inverters, each of said one or more inverters having an input and an output;
 - an RC network having an output node, said output node connected with said input of at least one of said one or more inverters;
 - a clamping device joined with said output of at least one of said one or more inverters; and
 - a feedback device in communication with said clamping device and said output node of said RC network.
- [c9] 9. An ESD protection circuit according to claim 8, wherein said RC network includes one or more resistors,

and one or more decoupling capacitors.

- [c10] 10. An ESD protection circuit according to claim 8, wherein said feedback device is an NFET.
- [c11] 11. An ESD protection circuit according to claim 8, wherein each of said one or more inverters includes a PFET and an NFET.
- [c12] 12. An ESD protection circuit according to claim 8, wherein said one or more inverters comprises at least three inverters.
- [c13] 13. An ESD protection circuit comprising:
 - one or more inverters, each of said one or more inverters having an input and an output;
 - a clamping device joined with said output of at least one of said one or more inverters;
 - means for timing the triggering of each of said one or more inverters; and
 - means for extending the time said clamping device is on, wherein said clamping device remains on until a high current portion of an ESD event terminates.
- [c14] 14. An ESD protection circuit according to claim 13, wherein said means for timing is an RC network.
- [c15] 15. An ESD protection circuit according to claim 14,

wherein said RC network includes one or more resistors, and one or more decoupling capacitors.

- [c16] 16. An ESD protection circuit according to claim 14, wherein said RC network includes an output node, said output node connected with said input of at least one of said one or more inverters.
- [c17] 17. An ESD protection circuit according to claim 12, wherein said means for extending includes a feedback device for preventing said clamping device from turning off for at least the first 500 ns of the ESD event.
- [c18] 18. An ESD protection circuit according to claim 16, wherein said means for extending is in communication with said clamping device and said output node of said RC network.
- [c19] 19. An ESD protection circuit according to claim 13, wherein said means for extending includes an NFET.
- [c20] 20. An ESD protection circuit according to claim 13, wherein each of said one or more inverters includes a PFET and an NFET.
- [c21] 21. An ESD protection circuit according to claim 13, wherein said one or more inverters comprises at least three inverters.

